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# How Does Living Alone Affect Dietary Quality?



## Abstract

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This report compares the dietary quality of adults who live alone to that of adults who live in multiperson households. Data from USDA's 1987-88 Nationwide Food Consumption Survey (NFCS 1987-88) were analyzed to measure dietary quality in terms of total energy intake, nutrient intakes, nutrient density (amount of nutrient per 1,000 kilocalories), and the amount of each food group in the diet.

Adults who lived alone ate less than other adults and their diets were significantly lower in food energy, protein, total fat, saturated fatty acids, calcium, phosphorus, and sodium. However, the diets of women living alone were significantly more nutrient-dense in carbohydrate, vitamins A, C, E, and $B_6$, carotenes, riboflavin, niacin, folate, magnesium, iron, and fiber than diets of women living in multiperson households. Diets of men living alone were more nutrient-dense in niacin, vitamin $B_6$, and folate than diets of men in multiperson households.

**Key Words**: dietary quality, food expenditure, nutrient density, nutrient intake, single-person household.

## Acknowledgments

The authors gratefully acknowledge the comments and suggestions provided by Mark Lino, Howard Riddick, and Anne Shaw, who reviewed sections of this report.



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## Contents



## List of Tables



## List of Figures

# How Does Living Alone Affect Dietary Quality?[1]

In the United States, the number of single-person households is increasing. According to the U.S. Bureau of the Census, 25 percent of American households consisted of one person in 1990, up from 17 percent in 1970. An understanding of the eating habits and the nutritional needs of these people as well as an awareness of their related demographic, socio-economic, and diet- and health-related characteristics assists policy makers in determining governmental policies and programs related to nutrition, food assistance, and health issues. This understanding also helps nutritionists in educating Americans to recognize the link between diet and health and to choose a more healthful diet and helps researchers in determining dietary survey and methodology needs for future research.

USDA has conducted the Nationwide Food Consumption Survey (NFCS) since 1955. The survey collects information on individual and household characteristics as well as food and nutrient intakes from households in the 48 contiguous States. The most recent NFCS was conducted in 1987-88. The survey was designed as a self-weighted sample of the American population, but the response was much lower than expected (less than 35 percent). This raised concern about the representativeness of the sample. A weighting scheme was developed to adjust for nonresponse; however, because the possibility of nonresponse bias may still exist, we caution against generalization of the results from our sample of 6,080 adults to the American population.

This report uses information from NFCS 1987-88 to compare the dietary quality of individuals in single-person households to that of those in multiperson households. Dietary quality was measured in terms of total energy intake, nutrient intake, nutrient density (amount of nutrient per 1,000 kilocalories), and the contribution of each food group to the total diet. Additionally, to obtain more insight into the possible reasons for differences in the diets between the two household types, we compared dietary quality of these types in terms of weekly food expenditure and selected demographic, socioecomonic, and diet- and health-related characteristics.

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Overall, population averages of food and nutrient intakes tend to hide the fact that some sex-age groups within the population consume significantly more or less of a nutrient or food group than others. Accordingly, we divided adult women and men in single-person and in multiperson households into subgroups defined by age: 19-34 years, 35-54 years, 55-64 years, 65-74 years, and 75 years and older. We then compared the dietary quality of adults who live alone to that of adults who live in multiperson households within each subgroup.

The diets of adults living alone were significantly lower in food energy, protein, total fat, saturated fatty acids, calcium, phosphorus, and sodium. However, the diets of women living alone were significantly more nutrient-dense in carbohydrate, vitamins A, C, E, and $B_6$, carotenes, riboflavin, niacin, folate, magnesium, iron, and fiber than diets of women living in multiperson households. Diets of men living alone were more nutrient-dense in niacin, vitamin $B_6$, and folate than diets of men in multiperson households.

Few significant differences between the dietary quality of adults living alone and those living in multiperson households were identified for the selected socio-economic, demographic, and health-related characteristics. Notable exceptions were dietary supplement use, reported health status, and years of formal education. Both men and women who lived alone were more likely to take vitamin and mineral supplements regularly. The youngest single women and the oldest single men were more likely to report "excellent" or "good" health status; but overall, single women were less likely to rate their health status as excellent or good than women living in multiperson households. Both of these differences may indicate a special interest in nutrition or a concern about the adequacy of dietary intake or general health by singles.

Younger men and women living alone were more likely to have more years of education, but this does not appear to have influenced their dietary quality.

## Nutrient Intakes

Overall, the diets of adults living alone were significantly lower in food energy, protein, total fat, saturated fatty acids, calcium, phosphorus, and sodium than the diets of adults living in multiperson households. In addition to these differences, single women had significantly lower intakes of thiamin, niacin, and zinc and significantly higher intakes of vitamin A. Which nutrients show

significant differences depends on age as well as sex. The tables below indicate which nutrients show significant differences in intake by persons who live alone in each age group compared to their counterparts in multiperson households.

In each age group, the nutrient intakes by the single women were generally lower than those of their counterparts in multiperson households (table 1, table 3). For example, in addition to the differences seen in the group overall, young single women 19-34 years of age had significantly lower intakes of riboflavin, vitamin $B_6$, and iron.

Similarly, nutrient intakes by single men in each age group were generally lower than their counterparts in multiperson households (table 2, table 4). Single men 35-54 years of age had significantly lower nutrient intakes of calcium and sodium as well as of vitamin C, vitamin E, and thiamin and significantly higher intakes of cholesterol than did their counterparts in multiperson households. Single men 65-74 years of age had significantly lower intakes of carotenes, vitamin E, and dietary fiber and significantly higher intakes of cholesterol than did men in this age group living in multiperson households. The oldest single men (75 years of age and older) had significantly lower intakes of protein, calcium, phosphorus, and zinc than did their counterparts in multiperson households.

Figures 1 and 2 show the differences in intake between adults who live alone and those living with others expressed as a percentage of the intake of those living with others. A negative value indicates that singles' intake is less than that of those living with others;

**Table 1. Nutrient intakes: Women living alone as compared to women living with others**

[L: significantly lower; H: significantly higher. From weighted mean 3-day intakes; significant at p<.05. Blank cells indicate no statistically significant relation]

| Nutrient | Age (years) | | | | | |
|---|---|---|---|---|---|---|
| | All ages | 19-34 | 35-54 | 55-64 | 65-74 | 75+ |
| Food energy | L | L | - | - | - | - |
| Carbohydrate | - | - | - | - | - | - |
| Protein | L | L | - | L | - | L |
| Fat | L | L | - | L | - | - |
| Saturated fat | L | L | L | - | - | - |
| Vitamin A | H | - | - | H | - | - |
| Carotenes | - | - | - | - | - | - |
| Vitamin C | - | - | - | - | - | - |
| Vitamin E | - | - | - | - | - | - |
| Thiamin | L | L | - | - | - | - |
| Riboflavin | - | L | - | - | - | - |
| Niacin | L | L | - | - | - | - |
| Vitamin $B_6$ | - | L | - | - | - | - |
| Vitamin $B_{12}$ | - | - | - | - | - | - |
| Folate | - | - | - | - | - | - |
| Phosphorus | L | L | - | - | - | - |
| Calcium | L | L | - | - | - | - |
| Magnesium | - | - | - | - | - | - |
| Iron | - | L | - | - | - | - |
| Zinc | L | L | - | L | - | - |
| Cholesterol | - | - | - | - | - | - |
| Fiber | - | - | - | - | - | - |
| Sodium | L | L | - | - | - | L |

**Table 2. Nutrient intakes: Men living alone as compared to men living with others**

[L: significantly lower; H: significantly higher. From weighted mean 3-day intakes; significant at p<.05. Blank cells indicate no statistically significant relation]

| Nutrient | Age (years) | | | | | |
|---|---|---|---|---|---|---|
| | All ages | 19-34 | 35-54 | 55-64 | 65-74 | 75+ |
| Food energy | L | - | - | - | - | - |
| Carbohydrate | - | - | - | - | - | - |
| Protein | L | - | - | - | - | L |
| Fat | L | - | - | - | - | - |
| Saturated fat | L | L | - | - | - | - |
| Vitamin A | - | - | - | - | - | - |
| Carotenes | - | - | - | - | L | - |
| Vitamin C | - | - | L | - | - | - |
| Vitamin E | - | - | L | - | L | - |
| Thiamin | - | - | L | - | - | - |
| Riboflavin | - | - | - | - | - | - |
| Niacin | - | - | - | - | - | - |
| Vitamin $B_6$ | - | - | - | - | - | - |
| Vitamin $B_{12}$ | - | L | - | - | - | - |
| Folate | - | - | - | - | - | - |
| Phosphorus | L | - | - | - | - | L |
| Calcium | L | - | L | - | - | L |
| Magnesium | - | - | - | - | - | - |
| Iron | - | - | - | - | - | - |
| Zinc | - | - | - | - | - | L |
| Cholesterol | - | - | H | - | H | - |
| Fiber | - | - | - | - | L | - |
| Sodium | L | - | L | L | - | - |

**Table 3. Mean nutrient intakes by women, by household type**

| Nutrient | Single-person household, by age | | | | | | Multiperson household, by age | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *All ages* | *19-34* | *35-54* | *55-64* | *65-74* | *75+* | *All ages* | *19-34* | *35-54* | *55-64* | *65-74* | *75+* |
| Food energy (kcal) | 1,311.01 | 1,288.13 | 1,370.49 | 1,337.51 | 1,322.22 | 1,267.82 | 1,474.54 | 1,537.17 | 1,431.74 | 1,452.01 | 1,424.95 | 1,412.92 |
| Carbohydrate (g) | 157.93 | 151.91 | 156.10 | 169.08 | 161.34 | 155.76 | 172.01 | 180.78 | 165.66 | 164.58 | 167.57 | 169.88 |
| Protein (g) | 54.56 | 50.79 | 59.89 | 57.06 | 56.63 | 51.29 | 61.24 | 61.61 | 60.24 | 63.99 | 61.24 | 58.04 |
| Fat (g) | 51.69 | 51.60 | 53.56 | 50.00 | 52.42 | 50.82 | 60.61 | 63.23 | 58.83 | 60.15 | 57.70 | 57.35 |
| Saturated fat (g) | 18.25 | 18.50 | 18.08 | 16.66 | 18.63 | 18.66 | 21.70 | 23.06 | 20.94 | 20.86 | 19.67 | 21.42 |
| Vitamin A (μg RE) | 1,065.76 | 777.87 | 1,301.56 | 1,216.42 | 1,224.05 | 953.78 | 883.44 | 830.09 | 852.67 | 991.85 | 993.24 | 1,104.26 |
| Carotenes (μg RE) | 484.98 | 313.46 | 613.55 | 535.05 | 611.70 | 421.03 | 399.07 | 361.57 | 388.21 | 435.96 | 504.02 | 523.89 |
| Vitamin C (mg) | 89.57 | 71.89 | 101.10 | 113.61 | 100.93 | 75.34 | 81.87 | 76.78 | 81.03 | 89.61 | 94.15 | 89.81 |
| Vitamin E (mg α-TE) | 6.68 | 5.83 | 7.01 | 7.06 | 7.20 | 6.57 | 6.70 | 6.73 | 6.44 | 7.06 | 7.20 | 5.80 |
| Thiamin (mg) | 1.03 | 0.91 | 0.97 | 1.02 | 1.13 | 1.11 | 1.13 | 1.12 | 1.09 | 1.18 | 1.13 | 1.11 |
| Riboflavin (mg) | 1.39 | 1.27 | 1.35 | 1.38 | 1.49 | 1.46 | 1.43 | 1.46 | 1.37 | 1.49 | 1.46 | 1.47 |
| Niacin (mg) | 15.29 | 13.50 | 16.70 | 16.20 | 15.92 | 14.95 | 16.23 | 16.02 | 16.16 | 17.33 | 16.53 | 15.48 |
| Vitamin $B_6$ (mg) | 1.27 | 1.01 | 1.27 | 1.32 | 1.48 | 1.31 | 1.27 | 1.23 | 1.24 | 1.34 | 1.42 | 1.35 |
| Vitamin $B_{12}$ (μg) | 5.21 | 5.25 | 7.54 | 6.29 | 4.31 | 3.76 | 4.48 | 4.35 | 4.48 | 5.24 | 3.89 | 4.67 |
| Folate (μg) | 204.46 | 170.83 | 194.49 | 209.67 | 236.44 | 212.33 | 193.10 | 188.33 | 186.86 | 207.14 | 218.32 | 197.34 |
| Phosphorus (mg) | 864.92 | 834.06 | 894.82 | 881.61 | 906.49 | 829.21 | 945.12 | 973.52 | 916.65 | 959.04 | 930.62 | 894.71 |
| Calcium (mg) | 550.31 | 547.24 | 504.55 | 523.84 | 588.38 | 566.93 | 598.75 | 638.83 | 562.05 | 584.19 | 584.00 | 585.09 |
| Magnesium (mg) | 202.15 | 173.53 | 224.82 | 216.81 | 224.45 | 189.49 | 202.15 | 191.31 | 203.67 | 221.23 | 221.23 | 199.75 |
| Iron (mg) | 10.04 | 9.10 | 9.97 | 10.22 | 10.53 | 10.42 | 10.57 | 10.35 | 10.34 | 11.42 | 11.07 | 11.03 |
| Zinc (mg) | 7.75 | 6.52 | 8.34 | 7.70 | 7.84 | 8.34 | 8.55 | 8.56 | 8.34 | 9.03 | 8.77 | 8.60 |
| Cholesterol (mg) | 225.37 | 216.62 | 236.03 | 230.01 | 230.57 | 219.25 | 241.77 | 246.40 | 239.54 | 244.73 | 231.79 | 227.85 |
| Fiber (g) | 11.32 | 9.31 | 12.02 | 12.07 | 12.87 | 11.00 | 10.78 | 9.98 | 10.78 | 11.80 | 12.88 | 11.25 |
| Sodium (mg) | 2,076.43 | 2,086.36 | 2,227.82 | 2,167.81 | 2,049.73 | 1,937.73 | 2,423.95 | 2,516.78 | 2,346.51 | 2,422.87 | 2,333.56 | 2,352.53 |

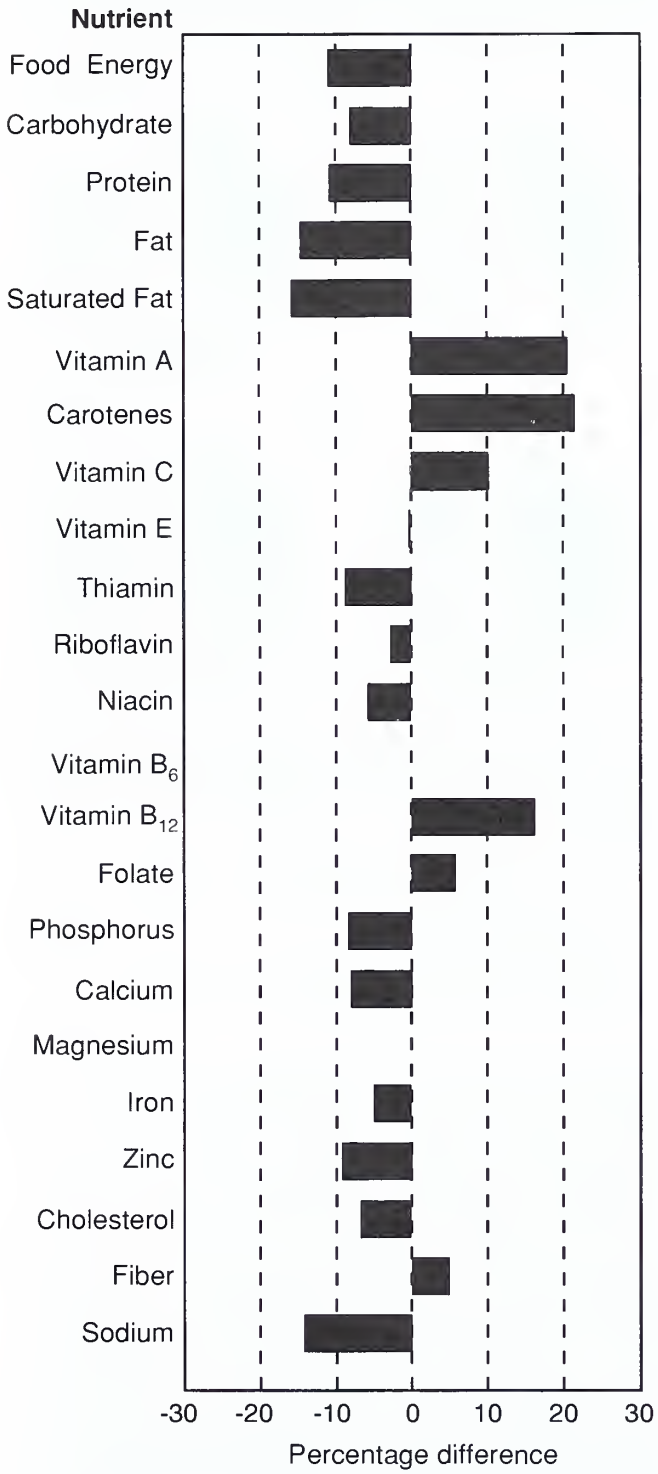
Weighted mean 3-day data from 1987-88 NFCS

**Table 4. Mean nutrient intakes by men, by household type**

| Nutrient | Single-person household, by age | | | | | | Multiperson household, by age | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All ages | 19-34 | 35-54 | 55-64 | 65-74 | 75+ | All ages | 19-34 | 35-54 | 55-64 | 65-74 | 75+ |
| Food energy (kcal) | 1,934.53 | 2,170.96 | 1,861.41 | 1,680.88 | 1,775.51 | 1,701.71 | 2,090.74 | 2,218.96 | 2,070.71 | 1,946.37 | 1,885.98 | 1,912.75 |
| Carbohydrate (g) | 219.55 | 257.00 | 195.25 | 178.89 | 213.31 | 209.35 | 233.95 | 251.68 | 228.73 | 211.82 | 211.06 | 223.90 |
| Protein (g) | 78.61 | 86.60 | 76.56 | 77.99 | 74.58 | 58.56 | 85.58 | 88.47 | 85.61 | 82.72 | 78.21 | 82.02 |
| Fat (g) | 77.41 | 84.56 | 77.64 | 72.29 | 67.25 | 65.09 | 87.60 | 92.22 | 87.37 | 83.52 | 78.61 | 77.40 |
| Saturated fat (g) | 27.08 | 28.97 | 27.06 | 26.69 | 24.21 | 23.34 | 31.17 | 33.72 | 30.83 | 28.89 | 26.46 | 26.91 |
| Vitamin A (μg RE) | 1,110.06 | 974.91 | 868.53 | 1,402.63 | 1,116.13 | 2,389.24 | 1,053.39 | 976.33 | 1,028.64 | 1,084.34 | 1,433.30 | 1,178.13 |
| Carotenes (μg RE) | 375.27 | 387.83 | 303.70 | 530.82 | 333.57 | 512.05 | 443.35 | 370.32 | 455.41 | 503.31 | 629.77 | 461.65 |
| Vitamin C (mg) | 99.51 | 114.44 | 69.01 | 100.64 | 119.34 | 132.21 | 96.92 | 93.35 | 96.50 | 103.54 | 101.06 | 105.76 |
| Vitamin E (mg α-TE) | 8.60 | 10.10 | 7.40 | 9.10 | 7.95 | 7.50 | 9.18 | 9.25 | 8.82 | 9.18 | 10.62 | 8.60 |
| Thiamin (mg) | 1.45 | 1.60 | 1.25 | 1.56 | 1.48 | 1.43 | 1.55 | 1.57 | 1.53 | 1.58 | 1.51 | 1.63 |
| Riboflavin (mg) | 1.83 | 1.94 | 1.58 | 2.06 | 1.94 | 1.98 | 1.92 | 2.01 | 1.84 | 1.84 | 1.93 | 2.05 |
| Niacin (mg) | 22.65 | 24.94 | 21.69 | 21.19 | 20.56 | 21.10 | 22.45 | 22.78 | 22.67 | 21.73 | 21.89 | 20.83 |
| Vitamin $B_6$ (mg) | 1.77 | 1.91 | 1.58 | 1.87 | 1.88 | 1.76 | 1.75 | 1.77 | 1.71 | 1.87 | 1.84 | 1.78 |
| Vitamin $B_{12}$ (μg) | 6.76 | 5.01 | 6.28 | 6.49 | 6.19 | 17.49 | 6.42 | 7.01 | 6.09 | 5.53 | 6.61 | 5.91 |
| Folate (μg) | 260.04 | 275.32 | 216.34 | 289.99 | 299.48 | 287.84 | 250.41 | 248.88 | 249.35 | 249.35 | 263.59 | 259.46 |
| Phosphorus (mg) | 1,176.01 | 1,334.07 | 1,079.24 | 1,173.67 | 1,116.93 | 974.53 | 1,298.81 | 1,383.55 | 1,251.98 | 1,223.44 | 1,175.45 | 1,286.68 |
| Calcium (mg) | 678.56 | 783.64 | 579.83 | 761.25 | 680.37 | 539.96 | 802.32 | 899.33 | 739.68 | 733.50 | 726.47 | 786.74 |
| Magnesium (mg) | 265.55 | 287.55 | 252.91 | 256.69 | 248.00 | 256.49 | 269.69 | 270.20 | 265.27 | 274.62 | 273.20 | 280.74 |
| Iron (mg) | 13.74 | 14.22 | 13.00 | 14.87 | 13.00 | 14.62 | 14.29 | 14.46 | 14.18 | 13.90 | 14.66 | 13.97 |
| Zinc (mg) | 11.45 | 12.21 | 10.94 | 11.46 | 12.25 | 9.09 | 12.23 | 12.32 | 12.51 | 11.69 | 11.62 | 11.88 |
| Cholesterol (mg) | 320.45 | 317.71 | 307.97 | 405.24 | 348.54 | 254.10 | 348.28 | 353.52 | 357.69 | 331.57 | 316.12 | 334.00 |
| Fiber (g) | 14.32 | 15.55 | 13.83 | 12.55 | 12.52 | 15.32 | 14.73 | 14.68 | 14.16 | 14.91 | 16.09 | 16.53 |
| Sodium (mg) | 2,998.56 | 3,236.55 | 2,904.78 | 2,736.08 | 2,908.35 | 2,757.06 | 3,691.92 | 3,821.85 | 3,676.77 | 3,665.56 | 3,448.52 | 3,225.27 |

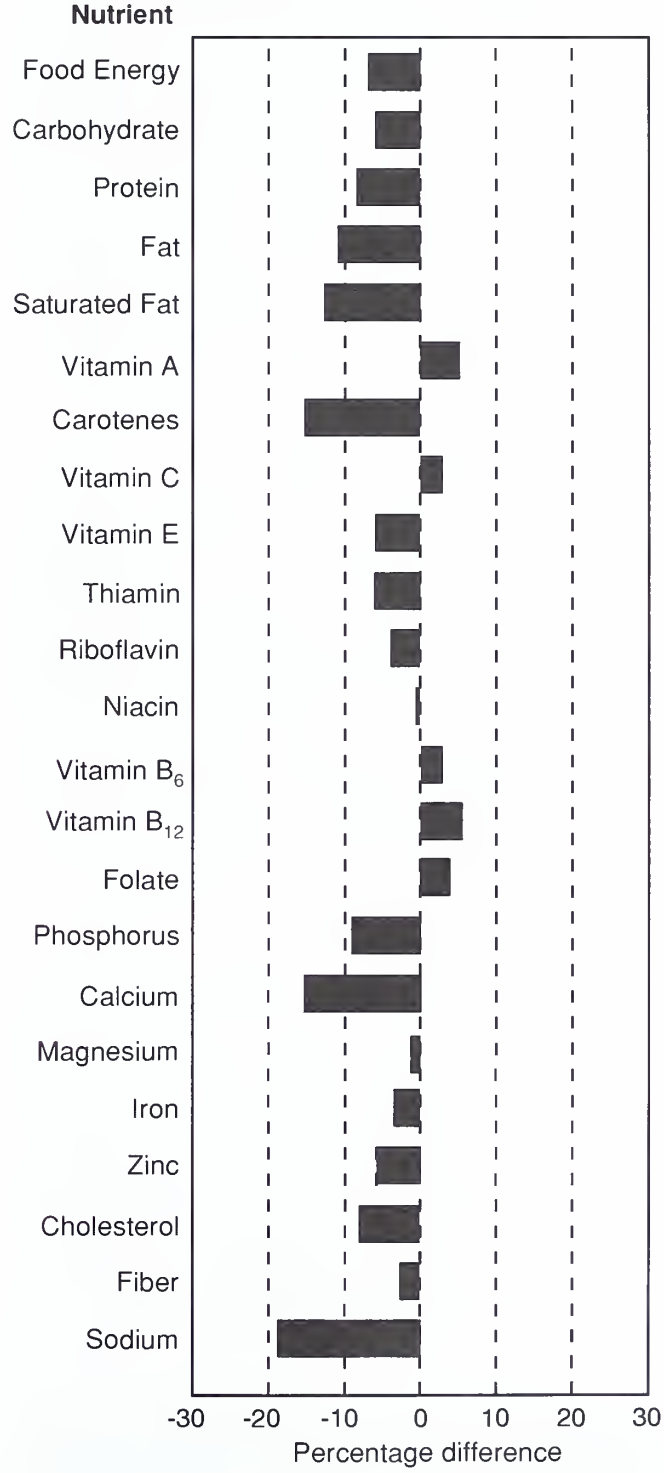
Weighted mean 3-day data from 1987-88 NFCS

**Figure 1. Percentage differences in nutrient intakes, women, all ages[1]**




[1] 3 day weighted data, NFCS 1987-88

**Figure 2. Percentage differences in nutrient intakes, men, all ages[1]**




[1] 3 day weighted data, NFCS 1987-88

positive values, that singles' intake is higher. The intakes of vitamin A, carotenes, vitamin C, and vitamin $B_{12}$ were at least 10 percent higher for single women than for women in multiperson households (figure 1).[2] For single men (figure 2) the intakes of total fat, saturated fatty acids, carotenes, calcium, and sodium were lower by at least 10 percent than for men in multiperson households. The higher intakes of vitamin A, carotenes, and vitamin C by single women and lower intakes of total fat, saturated fatty acids, and sodium by single men in each of the age groups (table 3, table 4) suggest that single persons are more willing to follow, or more successful in following, current dietary recommendations for an adequate diet and good health.

## Food Group Contributions

Figure 3 shows the proportions by weight of each food group in the diets of men and women. Fruits and vegetables made up more of the diets of single women than of the diets of women in multiperson households—23 percent and 19 percent, respectively. This helps to explain higher nutrient intakes of vitamin A, carotenes, and vitamin C by single women. These results suggest that women may prefer fruits and vegetables. The reason for thinking this is that women who live alone generally need to consider only their own preferences, while women in multiperson households have to consider the tastes of men and children. Thus single women can eat more of the foods they prefer.

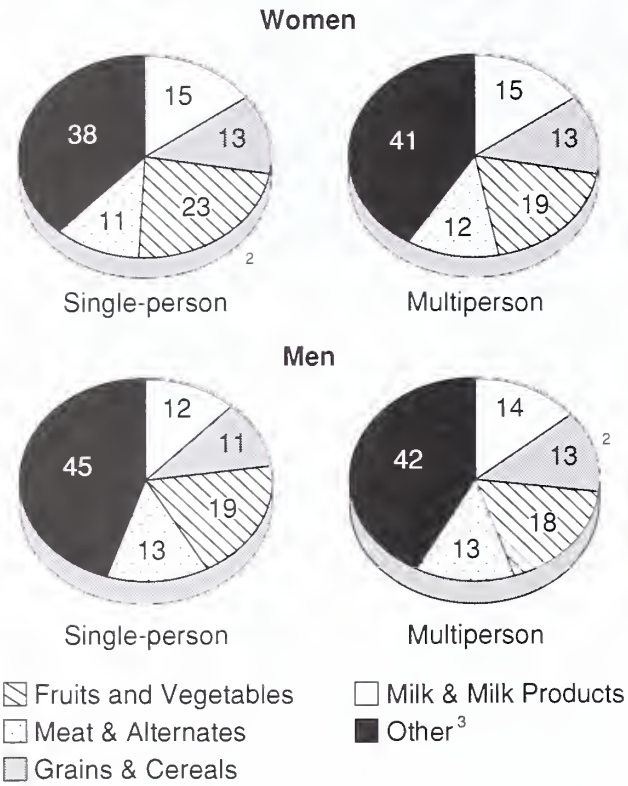
Results were different for men. Grain and cereal products (figure 3) made less of a contribution to the diets of men living alone than to the diets of men living in multiperson households. However, intakes of nutrients associated with this group, with the exception of dietary fiber, were not significantly lower for single men. Additionally, intakes of milk and milk products were lower for single men of all ages and significantly lower for the oldest single men. Milk intake may increase and decrease with increases and decreases in intake of cereals, and this relationship between milk and cereals may help to explain the lower intakes of calcium, phosphorus, and protein in single men.

## Nutrient Densities

Both single women and single men had diets significantly more nutrient-dense in niacin, vitamin $B_6$, and folate than did their counterparts in multiperson households. Single women had diets significantly more nutrient-dense in a number of other nutrients—carbohydrate, vitamin A, carotenes, vitamin C, vitamin E, riboflavin, magnesium, iron, and dietary fiber—and less nutrient-dense in total fat and saturated fatty acids (table 5). In particular, single women 55-64 years of age had significantly higher nutrient densities of vitamin C and lower nutrient densities of total fat and saturated fatty acids, and single women 65-74 years of age had significantly higher nutrient densities of vitamin A, carotenes, riboflavin, vitamin $B_6$, folate, and magnesium (table 5, table 7). The oldest single women—75 years of age and older—had significantly higher nutrient densities of vitamin E and folate.

In addition to having diets significantly more dense in niacin, vitamin $B_6$, and folate, single men's diets were

**Figure 3. Percentage contribution by weight by food groups, all ages[1]**




[1] 3-day weighted, NFCS 1987-88.
[2] Significant at $p<.05$
[3] "Other" includes fats, sugars, and alcoholic and nonalcoholic beverages.

[2] Percentage differences presented in this publication may not be statistically significant.

**Table 5. Nutrient densities: Women living alone as compared to women living with others**

[L: significantly lower; H: significantly higher. From weighted mean 3-day intakes; significant at p<.05. Blank cells indicate no statistically significant relation]

| Nutrient | Age (years) | | | | | |
|---|---|---|---|---|---|---|
| | All ages | 19-34 | 35-54 | 55-64 | 65-74 | 75+ |
| Carbohydrate | H | - | - | H | - | - |
| Protein | - | - | - | - | - | - |
| Fat | L | - | - | L | - | - |
| Saturated fat | L | - | - | L | - | - |
| Vitamin A | H | - | - | - | H | - |
| Carotenes | H | - | - | - | H | - |
| Vitamin C | H | - | - | H | - | - |
| Vitamin E | H | - | - | - | - | H |
| Thiamin | - | - | - | - | - | - |
| Riboflavin | H | - | - | - | H | - |
| Niacin | H | - | - | - | - | - |
| Vitamin $B_6$ | H | - | - | - | H | - |
| Vitamin $B_{12}$ | - | - | - | - | - | - |
| Folate | H | - | - | - | H | H |
| Phosphorus | - | - | - | - | - | - |
| Calcium | - | - | - | - | - | - |
| Magnesium | H | - | - | - | H | - |
| Iron | H | - | - | - | - | - |
| Zinc | - | L | - | - | - | - |
| Cholesterol | - | - | - | - | - | - |
| Fiber | H | - | H | - | - | - |
| Sodium | - | - | - | - | - | - |

**Table 6. Nutrient densities: Men living alone as compared to men living with others**

[L: significantly lower; H: significantly higher. From weighted mean 3-day intakes; significant at p<.05. Blank cells indicate no statistically significant relation]

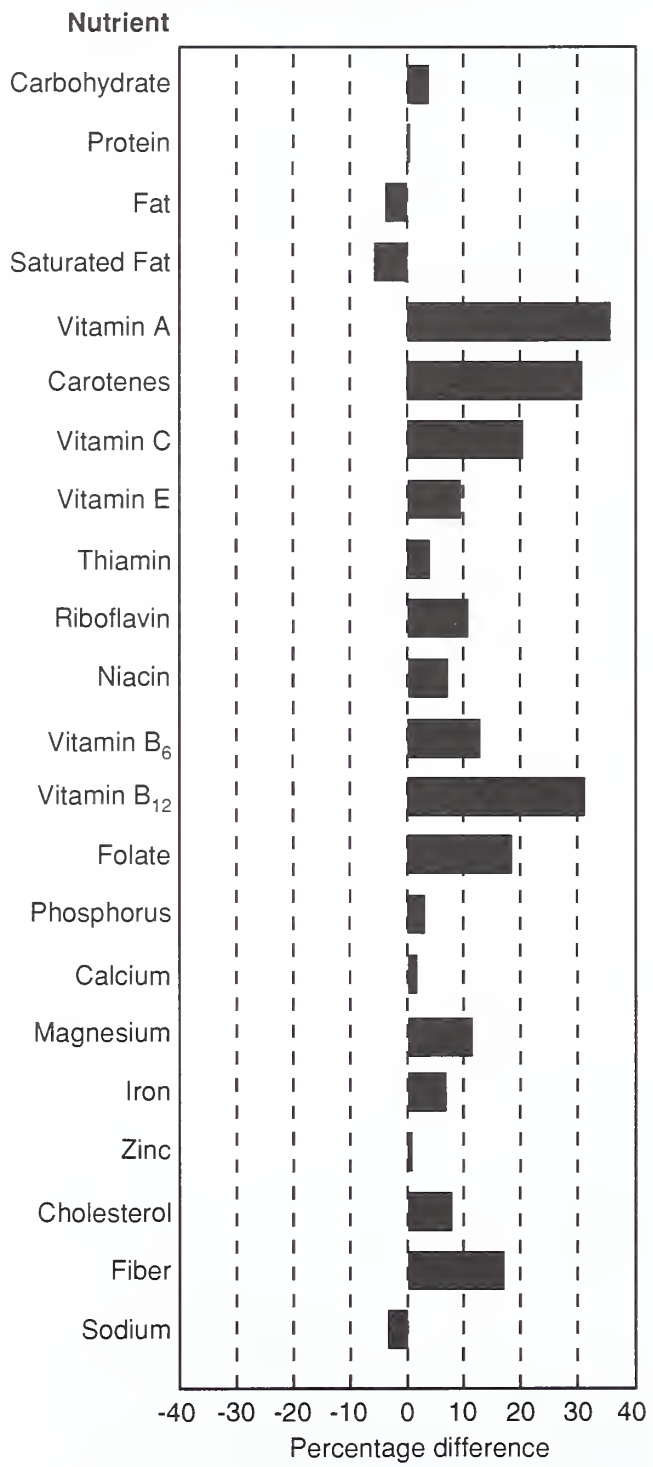
| Nutrient | Age (years) | | | | | |
|---|---|---|---|---|---|---|
| | All ages | 19-34 | 35-54 | 55-64 | 65-74 | 75+ |
| Carbohydrate | - | - | - | - | - | - |
| Protein | - | - | - | - | - | - |
| Fat | - | - | - | - | - | - |
| Saturated fat | - | - | L | - | - | - |
| Vitamin A | - | - | - | - | - | - |
| Carotenes | - | - | - | - | L | - |
| Vitamin C | - | - | L | - | - | - |
| Vitamin E | - | - | - | - | - | - |
| Thiamin | - | - | - | H | - | - |
| Riboflavin | - | - | - | H | - | - |
| Niacin | H | H | - | - | - | - |
| Vitamin $B_6$ | H | - | - | - | - | - |
| Vitamin $B_{12}$ | - | L | - | - | - | - |
| Folate | H | - | - | H | - | - |
| Phosphorus | - | - | - | - | - | L |
| Calcium | - | - | - | H | - | L |
| Magnesium | - | - | - | - | - | - |
| Iron | - | - | - | H | - | - |
| Zinc | - | - | - | - | - | - |
| Cholesterol | - | - | - | H | - | - |
| Fiber | - | - | - | - | L | - |
| Sodium | L | - | - | - | - | - |

less nutrient-dense in sodium. Single men 55-64 years of age had significantly higher nutrient densities for a number of nutrients—thiamin, riboflavin, folate, calcium, iron, and cholesterol—than did their counterparts in multiperson households (table 6, table 8). Men aged 75 and over living alone had significantly lower nutrient densities for calcium and phosphorus than men of the same age in multiperson households. These men were also less likely to consume milk and milk products than their counterparts in multiperson households.

Figures 4 and 5 show the differences in intake between adults who live alone and those living with others expressed as a percentage of the intake of those living with others. A negative value indicates that singles' intake is less than that of those living with others; positive values, that singles' intake is higher. The nutrient densities of vitamin A, carotenes, vitamin C, vitamin E, riboflavin, vitamin $B_6$, vitamin $B_{12}$, folate, magnesium, and dietary fiber were at least 10 percent higher for single women than for women in multiperson households (figure 4). In fact, for virtually all nutrients, densities for single women of all ages were higher than for women in multiperson households; the exceptions were total fat, saturated fatty acids, and sodium.

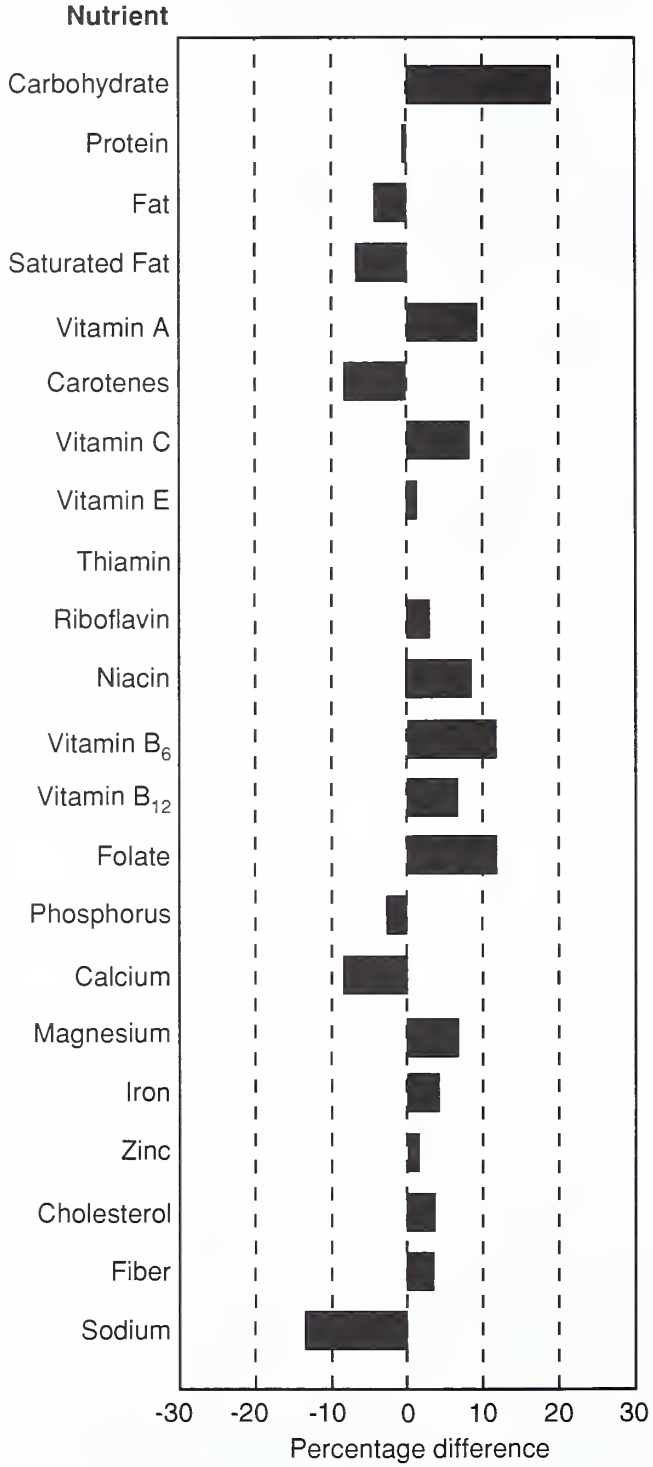
For single men the nutrient densities of carbohydrate, vitamin $B_6$, and folate were at least 10 percent higher for men in single-person households than for men in multiperson households (figure 5). The difference in carbohydrate density may be related to lower fat and higher carbohydrate intake. For both single women and single men there is a tendency to have diets less dense in total fat, saturated fatty acids, and sodium, and more

**Figure 4. Percentage differences in nutrient densities, women, all ages[1]**




[1] 3 day weighted data, NFCS 1987-88

**Figure 5. Percentage differences in nutrient densities, men, all ages[1]**




[1] 3 day weighted data, NFCS 1987-88

**Table 7. Mean nutrient densities of women, by household type**

| Nutrient | Single-person household, by age | | | | | | Multiperson household, by age | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *All ages* | *19-34* | *35-54* | *55-64* | *65-74* | *75+* | *All ages* | *19-34* | *35-54* | *55-64* | *65-74* | *75+* |
| Carbohydrate (g) | 120.94 | 117.70 | 113.74 | 127.82 | 122.29 | 123.91 | 116.56 | 117.59 | 115.75 | 112.72 | 117.91 | 121.45 |
| Protein (g) | 42.58 | 40.64 | 44.74 | 43.75 | 43.74 | 41.28 | 42.43 | 40.77 | 43.09 | 45.44 | 43.74 | 41.68 |
| Fat (g) | 38.87 | 39.67 | 38.98 | 36.28 | 39.15 | 39.22 | 40.69 | 40.81 | 40.66 | 41.14 | 40.12 | 39.74 |
| Saturated fat (g) | 13.67 | 14.21 | 13.10 | 11.93 | 13.93 | 14.30 | 14.52 | 14.86 | 14.43 | 14.22 | 13.66 | 14.59 |
| Vitamin A (µg RE) | 831.04 | 560.52 | 1,101.79 | 843.12 | 996.13 | 748.98 | 614.75 | 561.67 | 609.10 | 694.58 | 703.68 | 755.31 |
| Carotenes (µg RE) | 374.12 | 232.71 | 460.12 | 406.80 | 487.20 | 332.47 | 286.67 | 256.56 | 284.30 | 323.40 | 355.87 | 346.19 |
| Vitamin C (mg) | 69.24 | 52.52 | 76.61 | 91.00 | 78.25 | 60.13 | 57.57 | 51.21 | 59.47 | 63.58 | 68.01 | 64.41 |
| Vitamin E (mg α-TE) | 5.01 | 4.43 | 5.28 | 5.27 | 5.24 | 5.02 | 4.56 | 4.43 | 4.49 | 4.85 | 5.24 | 4.10 |
| Thiamin (mg) | 0.80 | 0.72 | 0.72 | 0.77 | 0.86 | 0.88 | 0.77 | 0.74 | 0.78 | 0.83 | 0.86 | 0.81 |
| Riboflavin (mg) | 1.08 | 0.97 | 1.07 | 1.01 | 1.17 | 1.15 | 0.98 | 0.96 | 0.97 | 1.04 | 1.04 | 1.05 |
| Niacin (mg) | 12.09 | 11.04 | 12.67 | 12.59 | 12.35 | 12.16 | 11.20 | 10.72 | 11.77 | 12.36 | 11.93 | 11.16 |
| Vitamin $B_6$ (mg) | 0.99 | 0.80 | 0.96 | 0.99 | 1.16 | 1.05 | 0.88 | 0.82 | 0.89 | 0.94 | 1.01 | 0.97 |
| Vitamin $B_{12}$ (µg) | 4.05 | 3.55 | 6.91 | 4.24 | 3.58 | 2.87 | 3.07 | 2.87 | 3.17 | 3.55 | 2.78 | 3.41 |
| Folate (µg) | 159.11 | 128.41 | 152.92 | 156.29 | 187.48 | 169.09 | 134.43 | 124.96 | 135.39 | 144.76 | 157.67 | 140.05 |
| Phosphorus (mg) | 665.91 | 652.63 | 670.22 | 662.79 | 692.14 | 655.00 | 648.44 | 640.28 | 647.95 | 672.32 | 658.29 | 640.98 |
| Calcium (mg) | 417.45 | 417.10 | 382.44 | 384.47 | 444.56 | 436.92 | 409.53 | 421.29 | 393.49 | 405.82 | 409.44 | 414.24 |
| Magnesium (mg) | 158.08 | 134.77 | 170.88 | 165.07 | 176.50 | 151.47 | 141.47 | 127.79 | 148.15 | 156.02 | 157.99 | 142.61 |
| Iron (mg) | 7.82 | 7.34 | 7.41 | 7.76 | 8.12 | 8.32 | 7.32 | 6.90 | 7.39 | 7.92 | 7.95 | 7.84 |
| Zinc (mg) | 5.96 | 5.12 | 6.14 | 6.07 | 6.13 | 6.41 | 5.92 | 5.69 | 5.95 | 6.34 | 6.22 | 6.08 |
| Cholesterol (mg) | 176.85 | 172.59 | 183.81 | 170.58 | 179.79 | 176.96 | 164.89 | 160.21 | 168.87 | 170.55 | 163.94 | 163.17 |
| Fiber (g) | 8.74 | 7.26 | 8.90 | 9.19 | 9.94 | 8.73 | 7.46 | 6.58 | 7.72 | 8.30 | 9.20 | 7.93 |
| Sodium (mg) | 1,604.01 | 1,668.40 | 1,654.92 | 1,643.68 | 1,558.51 | 1,527.66 | 1,668.16 | 1,660.40 | 1,672.06 | 1,685.12 | 1,652.39 | 1,693.82 |

Weighted mean 3-day data from 1987-88 NFCS

**Table 8. Mean nutrient densities of men, by household type**

| Nutrient | Single-person household, by age | | | | | | Multiperson household, by age | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All ages | 19-34 | 35-54 | 55-64 | 65-74 | 75+ | All ages | 19-34 | 35-54 | 55-64 | 65-74 | 75+ |
| Carbohydrate (g) | 133.32 | 117.86 | 104.10 | 112.30 | 120.21 | 123.21 | 111.96 | 114.20 | 109.53 | 109.40 | 111.53 | 119.43 |
| Protein (g) | 41.47 | 40.93 | 42.23 | 45.30 | 42.32 | 35.32 | 41.81 | 40.46 | 42.32 | 43.50 | 43.01 | 42.69 |
| Fat (g) | 39.67 | 38.96 | 41.18 | 41.02 | 39.15 | 39.22 | 41.67 | 41.28 | 42.21 | 42.36 | 41.39 | 39.48 |
| Saturated fat (g) | 13.85 | 13.35 | 14.25 | 15.02 | 13.42 | 13.82 | 14.77 | 15.03 | 14.89 | 14.61 | 13.85 | 13.74 |
| Vitamin A (μg RE) | 583.37 | 442.23 | 485.52 | 877.18 | 631.65 | 1,227.40 | 531.89 | 448.99 | 535.87 | 588.42 | 756.04 | 618.64 |
| Carotenes (μg RE) | 208.63 | 183.87 | 244.08 | 326.09 | 195.43 | 324.97 | 228.92 | 171.70 | 244.08 | 283.39 | 334.83 | 256.32 |
| Vitamin C (mg) | 52.80 | 55.10 | 37.15 | 61.71 | 70.76 | 73.06 | 48.61 | 44.61 | 48.12 | 56.01 | 54.40 | 56.71 |
| Vitamin E (mg α-TE) | 4.52 | 4.60 | 4.32 | 5.13 | 4.69 | 4.23 | 4.45 | 4.25 | 4.29 | 4.79 | 5.61 | 4.38 |
| Thiamin (mg) | 0.76 | 0.74 | 0.69 | 0.95 | 0.83 | 0.87 | 0.76 | 0.73 | 0.74 | 0.83 | 0.81 | 0.85 |
| Riboflavin (mg) | 0.96 | 0.87 | 0.88 | 1.29 | 1.08 | 1.12 | 0.93 | 0.92 | 0.90 | 0.96 | 1.04 | 1.07 |
| Niacin (mg) | 12.05 | 11.83 | 12.16 | 12.75 | 11.60 | 12.45 | 11.06 | 10.55 | 11.23 | 11.60 | 11.99 | 10.86 |
| Vitamin $B_6$ (mg) | 0.95 | 0.88 | 0.89 | 1.19 | 1.05 | 1.06 | 0.85 | 0.81 | 0.84 | 0.91 | 0.99 | 0.92 |
| Vitamin $B_{12}$ (μg) | 3.40 | 2.28 | 3.29 | 3.69 | 3.64 | 8.16 | 3.19 | 3.30 | 3.10 | 2.86 | 3.59 | 2.96 |
| Folate (μg) | 139.03 | 123.99 | 125.87 | 182.32 | 171.42 | 167.64 | 124.19 | 114.69 | 124.52 | 134.96 | 143.63 | 138.01 |
| Phosphorus (mg) | 608.97 | 611.58 | 586.42 | 696.31 | 625.15 | 575.37 | 627.09 | 630.46 | 611.28 | 638.57 | 637.08 | 674.52 |
| Calcium (mg) | 349.62 | 346.74 | 322.71 | 464.90 | 366.99 | 326.69 | 383.20 | 403.68 | 358.32 | 377.76 | 384.29 | 415.75 |
| Magnesium (mg) | 140.10 | 133.72 | 137.96 | 159.65 | 141.06 | 154.73 | 131.70 | 122.51 | 131.03 | 145.16 | 148.78 | 148.42 |
| Iron (mg) | 7.32 | 6.65 | 7.20 | 8.92 | 7.26 | 9.14 | 7.01 | 6.68 | 6.99 | 7.35 | 7.94 | 7.39 |
| Zinc (mg) | 6.05 | 5.72 | 6.12 | 6.66 | 6.80 | 5.53 | 5.95 | 5.59 | 6.16 | 6.12 | 6.40 | 6.17 |
| Cholesterol (mg) | 175.17 | 155.33 | 171.87 | 257.09 | 208.49 | 140.98 | 169.44 | 159.93 | 177.78 | 173.49 | 170.00 | 173.78 |
| Fiber (g) | 7.40 | 7.18 | 7.12 | 7.70 | 7.19 | 9.52 | 7.16 | 6.62 | 6.96 | 7.79 | 8.67 | 8.82 |
| Sodium (mg) | 1,553.16 | 1,506.84 | 1,534.69 | 1,609.29 | 1,637.80 | 1,653.09 | 1,795.10 | 1,747.93 | 1,798.26 | 1,924.75 | 1,841.70 | 1,749.34 |

Weighted mean 3-day data from 1987-88 NFCS

dense in carbohydrate, vitamins A and C, and fiber. As with nutrient intakes, this dietary behavior suggests that adults living alone have a greater awareness of current dietary recommendations and make a greater effort to follow such advice than adults living in multiperson households.

## Measures of Dietary Quality

Dietary quality depends on the intake of numerous nutrients and dietary components that provide variety and promote health and well-being. Assessing dietary quality in terms of the three measures—nutrient intake, nutrient density, and food group contribution to the total diet—not only considers the intake of many nutrients and foods but also the reliance by individuals on certain food groups. This gives a more complete picture of the dietary behavior of adults than assessing only nutrient intakes.

The results show that lower nutrient intakes do not necessarily mean lower nutrient densities, nor do they necessarily indicate a diet of poorer quality than one with higher intakes. A more nutrient-dense diet may make it easier to obtain important nutrients. For example, single women had higher nutrient density for vitamin A, and this helped them to achieve a higher total intake of vitamin A, even though they consumed fewer kilocalories. However, adequate absolute amounts of nutrients need to be consumed to avoid nutrient deficiencies and to obtain adequate kilocalories for normal activity. Single women also had a higher nutrient density for iron, but their total iron intake was lower.

Examination of these results suggests a positive relationship between nutrient density and absolute nutrient intake of a given nutrient when consumption of foods rich in that nutrient play a major part of the diet. Although specific nutrient intakes or densities are higher in one household type than the other, adults from both single-person and multiperson households have some common problems in meeting dietary guidance objectives. Women had low intakes of calcium, iron, zinc, and dietary fiber. Men had high intakes of cholesterol. Total fat and saturated fatty acid intakes were higher than dietary recommendations for both women and men. All would benefit from nutritional intervention programs.

## Food Expenditures

Single-person households share common characteristics that can affect dietary behavior. For example, single-person households tend to spend more money per capita on food.

**Table 9. Food expenditures, by household type**

| | *Single-person* | *Multiperson* |
|---|---|---|
| *Food Cost:* | ----------per week---------- | |
| At home | $28.33 | $68.10 |
| Away from home | $13.34 | $33.08 |
| Total | $41.69 | $101.27 |
| Per person | $41.69 | $34.11 |
| *Income:* | ----------per year---------- | |
| Household | $16,123.00 | $32,681.00 |
| Per person | $16,123.00 | $11,574.00 |
| Percentage of annual income spent on food | 13.4% | 16.1% |

In this study, single-person households had a lower total food bill than multiperson households. Single persons spent an average of 13.4 percent of their household income on food, while multiperson households spent 16.1 percent of household income on food (table 9).

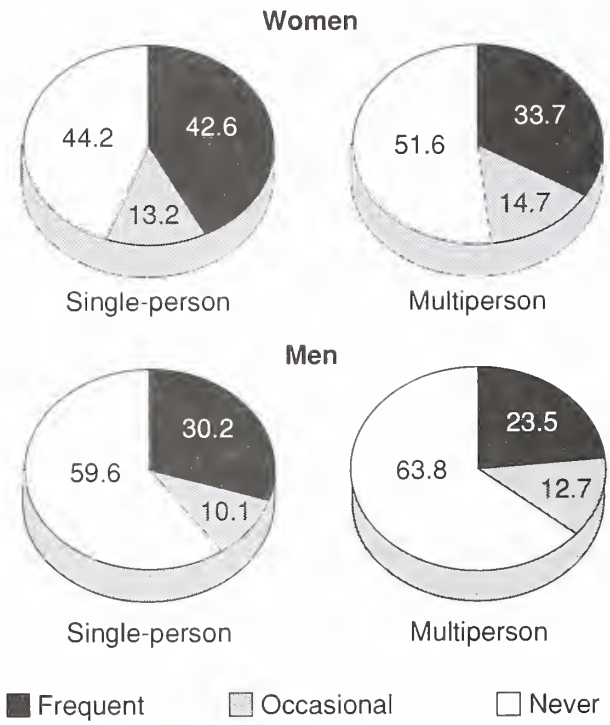
However, as might be expected, per-person food expenditures by singles were 25 percent higher than in multiperson households. Food expenditure per person tends to decline as household size increases because larger households can take advantage of economies of scale, such as buying in bulk.

## Socioeconomic, Demographic, and Diet- and Health-Related Characteristics

Few significant differences were found in the socioeconomic, demographic, and health-related characteristics studied. People living alone used vitamin and mineral supplements more frequently than those in multiperson households. Two-fifths of the women and one-third of the men in single-person households reported using supplements frequently, while one-third of the women and one-fourth of the men in multiperson households did (figure 6).

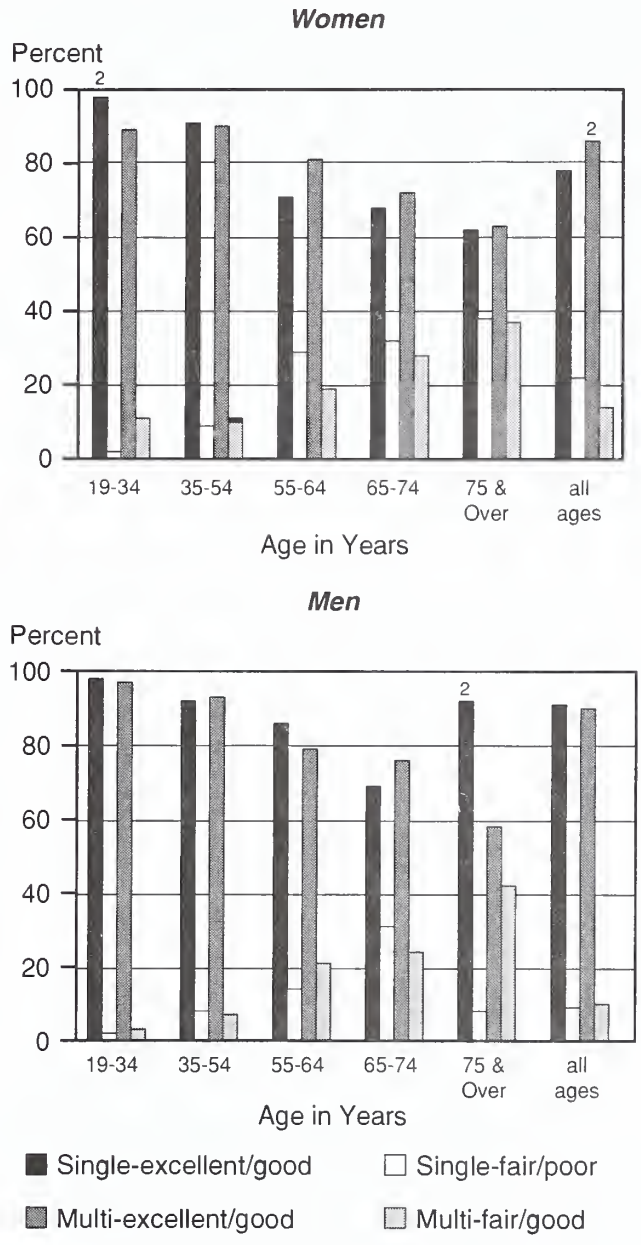
The youngest female and the oldest male singles were more likely to report an "excellent" or "good" health status. Overall, however, single women were less likely to rate their health status as excellent or good than were

**Figure 6. Supplement use, all ages[1]**




[1] 3 day weighted data, NFCS 1987-88

**Figure 7. Reported health status, by age[1]**



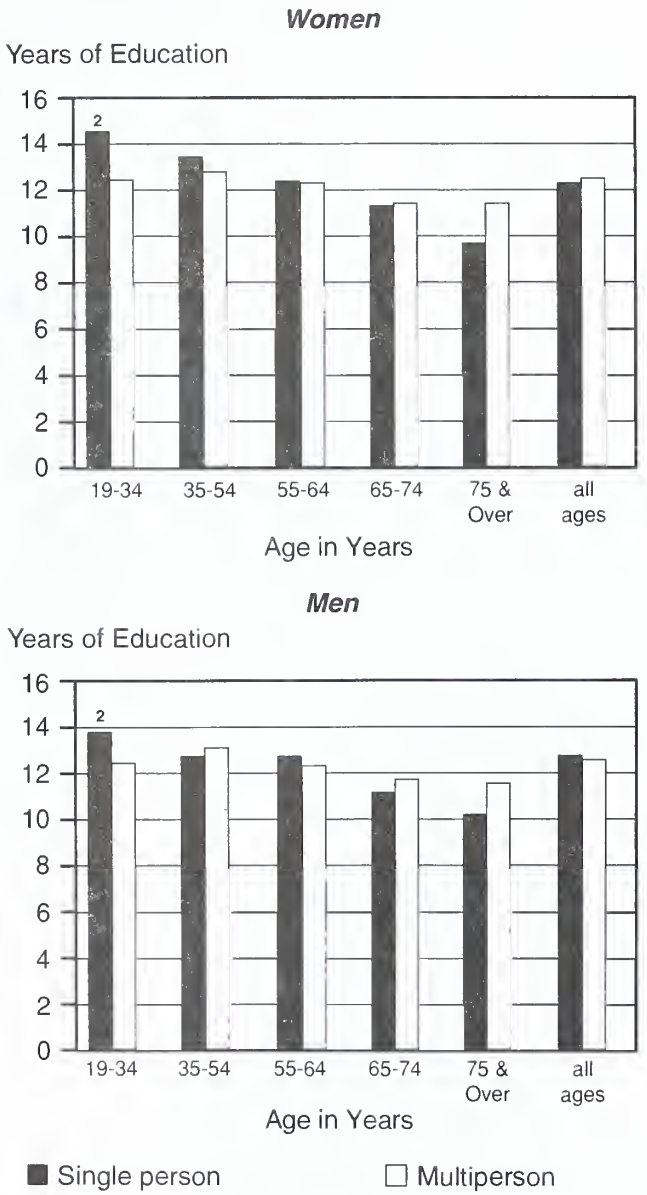

[1] 3 day weighted data,
[2] Significant at p<.05.

women living in multiperson households (figure 7). These differences may indicate that single women have a special interest in nutrition or a concern about the adequacy of dietary intake or general health. There was no overall significant difference in the reported health status between men living alone and men in multiperson households.

Men and women 19-34 years of age who live alone had more years of education than did their counterparts in multiperson households (figure 8). The level of education did not appear to relate to improved dietary intakes for either group. In fact, young single women with more years of education had lower intakes for many nutrients than did other single women or women living in multiperson households (table 3).

Overall, it appears that in this study, supplement use and reported health status are the socioeconomic, demographic, and health-related characteristics which may have the strongest relation to the dietary quality of adults living in these two types of households.

**Figure 8. Years of Education, by age[1]**




[1] 3 day weighted data, NFCS
[2] Significant at p<.05.

## Additional Readings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